

WHAT IS CLAIMED IS:

1. A balloon catheter operable to detect and report obstructions in a blood vessel, comprising:
 - a. an expandable balloon; and
 - b. a plurality of strain gauges each operable to report a degree of expansion of a local portion of a wall of said expandable balloon.
2. The catheter of claim 1, wherein at least one of said strain gauges is mounted external to a wall of said balloon.
3. The catheter of claim 1, wherein at least one of said strain gauges is mounted internal to a wall of said balloon.
4. The catheter of claim 1, wherein at least one of said strain gauges is embedded in a wall of said balloon.
5. The catheter of claim 1, wherein a plurality of said strain gauges are mounted in a circumferential configuration around said balloon.
6. The catheter of claim 5, wherein said strain gauges are mounted in a plurality of circumferential configurations.
7. The catheter of claim 1, further comprising a radio-opaque marker.
8. The catheter of claim 7, comprising a plurality of radio-opaque markers mounted in an asymmetric configuration.

9. The catheter of claim 1, further comprising an ultrasound marker distinguishable under ultrasound imaging.

10. The catheter of claim 9, comprising a plurality of ultrasound markers distinguishable under ultrasound imaging, mounted in an asymmetric configuration.

11. The catheter of claim 1, wherein said strain gauges are operable to report strain through a wire connection.

12. The catheter of claim 1, wherein said strain gauges are operable to report strain through a wireless connection.

13. A method for detecting obstruction in a blood vessel, comprising:

a. introducing into said blood vessel a balloon catheter having an expandable balloon which comprises a plurality of strain gauges operable to measure and report degrees of expansion of local portions of a wall of said expandable balloon;

b. expanding said balloon within said blood vessel;

c. comparing expansions reported by a plurality of strain gauges;

and

d. reporting obstruction of said blood vessel if at least one of said plurality of strain gauges reports less expansion than another of said strain gauges.

14. The method of claim 13, further comprising determining a position of said balloon in a body of a patient when said balloon is positioned within said artery at a position at which obstruction of said blood vessel is so reported.

15. The method of claim 14, further comprising determining said position of said balloon by observing, using an x-ray visualization modality, a radio-opaque marker of said balloon.

16. The method of claim 15, further comprising observing a plurality of radio-opaque markers.

17. The method of claim 14, wherein said position of said balloon is determined by observing, using an ultrasound visualization modality, an ultrasound-distinguishable marker disposed at a known position in said balloon.

18. The method of claim 14, further comprising displaying, in a graphics display, an image of a portion of a body of a patient, obtained through use of a medical imaging modality, integrated with an image of detected plaque within said blood vessel.

19. A system for detecting and localizing obstructing material in a blood vessel, comprising:

a. an expandable balloon catheter having an expandable balloon which comprises a plurality of strain gauges operable to measure and report local expansion of portions of said expandable balloon

b. a data analysis module operable to calculate an analysis of data received from said plurality of strain gauges.

20. The system of claim 19, wherein said data analysis module is further operable to record, in a memory module, data reported by said strain gauges.

21. The system of claim 20, further comprising said memory module.

22. The system of claim 19, wherein said data analysis module comprises a graphics display.

23. The system of claim 19, wherein said data analysis module is operable to calculate a first image of a blood vessel showing regions of obstruction therein, as indicated by data obtained from said strain gauges.

24. The system of claim 23, wherein said data analysis module is further operable to integrate said first image of said blood vessel with a second image produced by a standard imaging modality.

25. The system of claim 24, wherein said second image is a fluoroscopic image.

26. The system of claim 24, wherein said second image is an ultrasound image.

27. The system of claim 19, further operable to display, on a graphics display, an image obtained from a medical imaging modality.

28. The system of claim 27, wherein said imaging modality is a fluoroscope.

29. The system of claim 27, wherein said imaging modality is an ultrasound system.

30. The system of claim 27, wherein said data analysis module is operable to modify said image so as to represent, on said modified image, areas of obstruction of a blood vessel as determined by said analysis of said data from said plurality of strain gauges.

31. The system of claim 19, wherein at least one of said strain gauges is mounted external to a wall of said balloon.

32. The system of claim 19, wherein at least one of said strain gauges is mounted internal to a wall of said balloon.

33. The system of claim 19, wherein at least one of said strain gauges is embedded in a wall of said balloon.

34. The system of claim 19, wherein a plurality of said strain gauges are mounted in a circumferential configuration around said balloon.

35. The system of claim 34, wherein said strain gauges are mounted in a plurality of circumferential configurations.

36. The system of claim 19, further comprising a radio-opaque marker on said balloon.

37. The system of claim 36, comprising a plurality of radio-opaque markers mounted in an asymmetric configuration.

38. The system of claim 19, wherein said balloon comprises an ultrasound marker distinguishable under ultrasound imaging.

39. The system of claim 38, wherein said balloon comprises a plurality of ultrasound markers distinguishable under ultrasound imaging, mounted in an asymmetric configuration.

40. The system of claim 19, wherein said strain gauges are operable to report strain to said data analysis module through a wire connection.

41. The system of claim 19, wherein said strain gauges are operable to report strain to said data analysis module through a wireless connection.